

CONTENTS

INTRODUCTION	1	
<i>General Existence and Uniqueness of Approximations</i>		
Exercises	8	
CHAPTER 1	UNIFORM APPROXIMATION	11
1.1	Uniform Approximation by Polynomials	11
1.1.1	<i>The Weierstrass Theorem and Bernstein Polynomial Approximation</i>	11
1.1.2	<i>Jackson's Theorems</i>	17
1.2	Characterization of Best Approximations	24
1.3	Approximation on a Finite Set of Points	33
1.4	Computational Methods	40
1.4.1	<i>The Exchange Method</i>	40
1.4.2	<i>Linear Programming</i>	42
Exercises		43
CHAPTER 2	LEAST-SQUARES APPROXIMATION	48
2.1	Approximation on an Interval	48
2.2	The Jacobi Polynomials	52
2.3	Approximation on a Finite Set of Points	55
2.4	Effectiveness as a Uniform Approximation	57
Exercises		61
CHAPTER 3	LEAST-FIRST-POWER APPROXIMATION	66
3.1	Approximation on an Interval	66
3.2	Approximation on a Finite Set of Points	73
3.3	Some Computational Aspects	78
Exercises		83

CHAPTER 4	POLYNOMIAL AND SPLINE INTERPOLATION	87
4.1	General Results	87
4.2	The Size of the Lebesgue Constants	90
4.3	Interpolating Polynomials as Least-Squares and Least-First-Power Approximations	101
4.4	Interpolation and Approximation by Splines	104
	4.4.1 <i>Spline Interpolation</i>	104
	4.4.2 <i>Some Extremal Properties of Splines</i>	108
	4.4.3 <i>Uniform Approximation by Splines</i>	110
	4.4.4 <i>Least-Squares Approximation by Splines</i>	113
	Exercises	114
CHAPTER 5	APPROXIMATION AND INTERPOLATION BY RATIONAL FUNCTIONS	120
5.1	Existence, Characterization, and Uniqueness	120
5.2	Degree of Approximation	128
5.3	Finite Point Sets	130
5.4	Rational Interpolation	132
5.5	Computing a Best Approximation	135
	Exercises	138
BIBLIOGRAPHY		143
INDEX		149