

Contents

Preface	vii
Introduction	1
I The fixed point theorems of Brouwer and Schauder	5
1 The fixed point theorem of Brouwer and applications	6
2 The fixed point theorem of Schauder and applications	10
II Measures of noncompactness	17
1 The general notion of a measure of noncompactness	18
2 The Kuratowski and Hausdorff measures of noncompactness	20
3 The separation measure of noncompactness	26
4 Measures of noncompactness in Banach sequences spaces	34
5 Theorem of Darbo and Sadovskii and applications	38
III Minimal sets for a measure of noncompactness	45
1 ϕ -minimal sets	46
2 Minimalizable measures of noncompactness	49
IV Convexity and smoothness	57
1 Strict convexity and smoothness	57
2 k -uniform convexity	62
3 k -uniform smoothness	79
V Nearly uniform convexity and nearly uniform smoothness	85
1 Nearly uniformly convex Banach spaces	86
2 Nearly uniformly smooth Banach spaces	97
3 Uniform Opial condition	102

VI	Fixed points for nonexpansive mappings and normal structure	109
1	Existence of fixed points for nonexpansive mappings: Kirk's theorem	111
2	The coefficient $N(X)$ and its connection with uniform convexity	114
3	The weakly convergent sequence coefficient	118
4	Uniform smoothness, near uniform convexity and normal structure	123
5	Normal structure in direct sum spaces	125
6	Computation of the normal structure coefficients in L^p -spaces	127
VII	Fixed point theorems in the absence of normal structure	131
1	Goebel-Karlovitz's lemma and Lin's lemma	132
2	The coefficient $M(X)$ and the fixed point property	134
VIII	Uniformly Lipschitzian mappings	141
1	Lifshitz characteristic and fixed points	142
2	Connections between the Lifshitz characteristic and certain geometric coefficients	145
3	The normal structure coefficient and fixed points	150
IX	Asymptotically regular mappings	153
1	A fixed point theorem for asymptotically regular mappings	154
2	Connections between the τ -characteristic and some other geometric coefficients	157
3	The weakly convergent sequence coefficient and fixed points	164
X	Packing rates and ϕ-contractiveness constants	167
1	Comparable measures of noncompactness	168
2	Packing rates of a metric space	170
3	Connections between the packing rates and the normal structure coefficients	176
4	Packing rates in ℓ^p -spaces	179
5	Packing rates in L^p -spaces	182
6	Packing rates in direct sum spaces	187
	References	197
	Subject Index	205
	List of Symbols and Notations	209