

Contents

1	Introduction	1
1.1	Rationale and Philosophy of This Book	1
1.2	History of Non-standard Growth Phenomena	3
1.3	Notation and Background.....	5
1.4	Tools Missing in Generalized Orlicz Spaces	10
2	Φ-Functions	13
2.1	Equivalent Φ -Functions.....	13
2.2	Upgrading Φ -Functions.....	19
2.3	Inverse Φ -Functions	23
2.4	Conjugate Φ -Functions	30
2.5	Generalized Φ -Functions	36
3	Generalized Orlicz Spaces	47
3.1	Modulars.....	47
3.2	Quasinorm and the Unit Ball Property	51
3.3	Convergence and Completeness	59
3.4	Associate Spaces	62
3.5	Separability	66
3.6	Uniform Convexity and Reflexivity	68
3.7	The Weight Condition (A0) and Density of Smooth Functions.....	72
4	Maximal and Averaging Operators	79
4.1	The Local Continuity Condition (A1).....	79
4.2	The Decay Condition (A2)	83
4.3	Maximal Operators.....	89
4.4	Averaging Operators and Applications.....	96
5	Extrapolation and Interpolation	105
5.1	Weights and Classical Extrapolation	106
5.2	Rescaling and Conditions (A0), (A1) and (A2).....	108

5.3	Diagonal and Off-Diagonal Extrapolation	110
5.4	Applications of Extrapolation	114
5.5	Complex Interpolation	117
6	Sobolev Spaces	123
6.1	Basic Properties	123
6.2	Poincaré Inequalities	128
6.3	Sobolev Embeddings.....	134
6.4	Density of Regular Functions	141
7	Special Cases	145
7.1	Variable Exponent Growth	145
7.2	Double Phase Growth.....	149
7.3	Other Conditions	153
7.4	Orlicz Spaces	156
	References	159
	Index	165