

Contents

1	Almost and Statistical Convergence of Ordinary Sequences:	
	A Preview	1
1.1	Introduction	1
1.2	Almost Convergence	2
1.2.1	Definitions and Examples	2
1.2.2	Properties of the Method f	4
1.3	Absolute and Strong Almost Convergence	5
1.4	Statistical Convergence	7
1.5	Statistical Limit Points and Statistical Cluster Points	9
1.6	Statistical Limit Superior and Statistical Limit Inferior	11
1.7	Knopp Core and Statistical Core	12
1.8	Matrix Transformations	12
1.9	Exercises	14
2	Almost Convergence of Double Sequences	17
2.1	Introduction	17
2.2	Some Auxiliary Results	19
2.3	Some Related Spaces of Double Sequences	22
2.4	Associated Sublinear Functionals	24
2.5	Some Basic Lemmas	27
2.6	Inclusion Relations	34
2.7	Exercises	39
3	Almost Regular Matrices	41
3.1	Introduction	41
3.2	Almost C_ν -Conservative Matrices	43
3.3	Strongly Regular Matrices	52
3.4	Almost Strongly Regular Matrices	58
3.5	Exercises	61
4	Absolute Almost Convergence and Riesz Convergence	63
4.1	Introduction	63

4.2	Almost Bounded Variation and Absolute Almost Convergence . .	64
4.3	Absolutely Almost Conservative Matrices	67
4.4	Riesz Convergence and Matrix Transformations	74
4.5	Exercises	76
5	Almost Convergence and Core Theorems	79
5.1	Introduction	79
5.2	Pringsheim's Core	80
5.3	M -Core	84
5.4	Examples	92
5.4.1	Almost Convergent Sequences	92
5.4.2	Strongly Regular Matrix	92
5.4.3	Bounded-Regular Matrix that Is Not Strongly Regular . .	93
5.4.4	In Theorem 5.6, Strong Regularity of A Cannot Be Replaced by Bounded-Regularity	93
5.5	Riesz Core	94
5.6	Exercises	96
6	Application of Almost Convergence in Approximation Theorems for Functions of Two Variables	99
6.1	Introduction	99
6.2	For Test Functions $1, x, y, x^2 + y^2$	100
6.3	For Test Functions $1, \frac{x}{1-x}, \frac{y}{1-y}, (\frac{x}{1-x})^2 + (\frac{y}{1-y})^2$	104
6.4	For Test Functions $1, \frac{x}{1+x}, \frac{y}{1+y}, (\frac{x}{1+x})^2 + (\frac{y}{1+y})^2$	108
6.5	Some Consequences	112
6.6	Exercises	114
7	Statistical Convergence of Double Sequences	117
7.1	Introduction	117
7.2	Statistically Convergent Sequences	118
7.3	Statistically Cauchy Sequences	121
7.4	Relation Between Statistical Convergence and Strong Cesàro Convergence	122
7.5	A -Statistical Convergence and Statistical A -Summability of Double Sequences	125
7.6	Statistical Convergence in Locally Solid Riesz Spaces	127
7.7	(λ, μ) -Statistical Convergence	128
7.8	Exercises	132
8	Statistical Approximation of Positive Linear Operators	133
8.1	Introduction	133
8.2	Korovkin-Type Theorem via Statistical A -Summability	134
8.3	Korovkin-Type Theorem via A -Statistical Convergence	138
8.4	A -Statistical Approximation for Periodic Functions and Rate of A -Statistical Convergence	142
8.5	Exercises	147

9	Double Series and Convergence Tests	149
9.1	Introduction	149
9.2	Convergence Tests	150
9.2.1	Cauchy Condensation Test	150
9.2.2	Abel's (k, ℓ) th Term Test	151
9.2.3	Limit Comparison Test	152
9.2.4	Ratio Test	153
9.2.5	Ratio Comparison Test	155
9.2.6	Raabe's Test	156
9.3	Cauchy Product	158
	References	167

Convergence Methods for Double Sequences and
Applications

Mursaleen, M.; Mohiuddine, S.A.

2014, IX, 171 p., Hardcover

ISBN: 978-81-322-1610-0