

CONTENT

Chapter I**Introduction**

1.1 History Related to Orthogonal Series	3
1.2 Basic Definitions and Some Fundamentals.....	4
1.2.1 Basic Definition	4
1.2.2 Orthogonality of System	5
1.2.3 Orthonormality of system.....	5
1.2.4 Orthogonalization Process.....	5
1.2.5 Orthogonal Series and Orthogonal Expansion.....	6
1.3 Different summabilities	7
1.3.1 Banach Summability.....	7
1.3.2 Absolute Banach Summability	8
1.3.3 Cesàro Summability.....	8
1.3.4 Absolute Cesàro Summability	9
1.3.5 Euler Summability	9
1.3.6 Absolute Euler Summability.....	9
1.3.7 Nörlund Summability	10
1.3.8 Absolute Nörlund Summability	10
1.3.9 (\bar{N}, p_n) Summability or Riesz Summability or (R, p_n) Summability.....	10
1.3.10 Absolute (N, p_n) Summability.....	11
1.3.11 Generalized Nörlund Summability or (N, p, q) Summability	11
1.3.12 Absolute Generalized Nörlund Summability or Absolute (N, p, q) Summability or $ N, p, q $ summability.....	12
1.3.13 (\bar{N}, p, q) Summability.....	12
1.3.14 Absolute (\bar{N}, p, q) Summability or $ \bar{N}, p, q $ Summability	13
1.3.15 Indexed Summability methods	13
1.3.15.1 $ N, p_n _k$ Summability.....	13
1.3.15.2 $ \bar{N}, p_n _k$ Summability.....	14
1.3.15.3 $ N, p_n, q_n _k$ Summability.....	14
1.3.15.4 $ \bar{N}, p_n, q_n _k$ Summability	15
1.3.15.5 (N, p_n^α) Summability.....	15
1.3.15.6 $ N, p_n^\alpha $ Summability	16

1.3.15.7 $(N, p_n^\alpha, q_n^\alpha)$ Summability.....	17
1.3.15.8 Absolute $(N, p_n^\alpha, q_n^\alpha)$ Summability	18
1.3.15.9 $ A _k ; k \geq 1$ Summability.....	18
1.3.15.10 $A A _k , k \geq 1, \delta \geq 0$ Summability.....	19
1.3.15.11 $\Phi - A _k , k \geq 1$ Summability.....	19
1.3.15.12 The product summability: $ (N, p_n, q_n)(N, q_n, p_n) _k, k \geq 1,$	19
1.3.15.13 The product summability $ (N, p_n, q_n)(N, q_n, p_n) _k, k \geq 1$	21
1.3.16 Lambert Summability.....	21
1.3.17 Generalized Lambert Summability.....	21
1.4 Absolute Summability of Double Orthogonal Series	21
1.4.1 $ N^{(2)}, p, q _k$ for $k \geq 1$ Summability.....	22
1.4.2 $ \bar{N}^{(2)}, p, q _k$ for $k \geq 1$ Summability	23
1.5 History related to Convergence of an Orthogonal Series	23
1.6 Summability of Orthogonal Series	25
1.7 Absolute Summability of Orthogonal Series: Banach and Generalized Nörlund Summabilty ...	26
1.8 Matrix Summability of an Orthogonal Series.....	29
1.9 Approximation by Nörlund Means of an Orthogonal Series	30
1.10 Absolute Generalized Nörlund Summability of Double Orthogonal Series	32
1.11 General Lambert Summability of an Orthogonal Series	33
1.12 Generalized Product Summability of an Orthogonal Series	34

Chapter II

Absolute Banach and $|N, p_n^\alpha, q_n^\alpha|, \alpha > -1$ Summability of General Orthogonal Series

2.1 Introduction	38
2.2 Absolute Banach Summability of Orthogonal Series	38
2.3 Absolute $(N, p_n^\alpha, q_n^\alpha), \alpha > -1$ Summability of General Orthogonal Series.....	41
2.4 Proof of Theorems	42
2.5 Proof of Corollaries	46

Chapter-III

Absolute Indexed Generalized Nörlund Summability of Orthogonal Series

3.1 Introduction	49
3.2 Absolute Indexed Generalized Nörlund Summability of Orthogonal Series.....	50
3.3 Proof of Theorems	52
3.4 Proof of Corollaries	54

Chapter IV

Absolute General Matrix Summability of an Orthogonal Series	
4.1 Introduction	57
4.1.1 General Matrix Summability	57
4.1.2 Orthogonal Series and Generalized Matrix Summability	58
4. 2 Generalized Matrix Summability of an Orthogonal Series.....	59
Chapter V	
Approximation by $(E, 1)$ means of Walsh- Fourier series	
5.1 Introduction	67
5.2 Walsh Fourier Series	68
5.3 Proof of Lemmas	72
5.4 Proof of Theorems	73
Chapter VI	
Absolute Indexed Generalized Nörlund Summability of Double Orthogonal Series	
6.1 Introduction	77
6.2 Double Orthogonal Series and Double Orthogonal Expansion.....	78
6.3 Absolute Indexed Generalized Nörlund Summability of Double Orthogonal Series	79
6.4 Proof of Theorems	80
CHAPTER VII	
Generalized Lambert Summability of Orthogonal Series	
7.1 Introduction	85
7.2 Generalized Lambert summability of Orthogonal series.....	85
7.3 Proof of Theorems	86
Chapter VIII	
Generalized Product Summability of an Orthogonal Series	
8.1 Introduction	92
8.2 Product Summability.....	93
8.3 Product Summability of Orthogonal Series.....	93
References.....	100