Faculty of Science
(Mathematics and Statistics)
S.m.1. VELUKKUTTY, K.K.—Some Problems of Discrete Function Theory—1982—Dr. Wazir Hasan Abdil.

This thesis is a study of discrete analytic functions defined on the lattice \( \{q^m x, q^n y \mid m, n \in \mathbb{Z} \} \) when \((x_0, y_0)\) is a fixed point in \( C \) and \( q \) is a fixed number in \((0, 1)\).

In the discrete function theory, the differential operator of the classical complex analysis is replaced by a suitable difference operator. The theory of discrete functions had its start from R.P. Isaac’s (1941) work who introduced two types of difference operators to describe analyticity namely monodiffricty of the first and second kinds. Farrand (1944), Duffin (1956), Abdulalev are some of the names who developed discrete function theory. The theory developed by these people has been mainly in the Gaussian lattice. q-difference theory was developed by Jackson, Hahn and Abdil and using this theory C. Harman (1972) developed a discrete function theory on the lattice \( \{q^m x, q^n y \} \).

This thesis starts with the investigation of functions which are both p-and q-analytic in certain domain in the discrete geometric space. The solution is named biaalytic function. The continuation of such a function from two adjacent rays is examined. Then the problem is generalised as investigation of functions having p- and q-residues equal. It is found that such functions satisfy the notion of monodiffricty of second kind in the geometric lattice. Such functions are now known as q-monodiffric functions.

Monodiffricty of second kind was not studied earlier in detail. Duffin and Harman had mistaken preholomorphicity as equivalent to this—which has been disproved in this thesis.

In the second chapter of this thesis, q-monodiffrict differentiation is discussed in detail, q-monodiffrict constant which is the general solution of the derivative equation: first derivative is equated to zero, is studied.

In discrete function theory, the concept of construction of an entire discrete analytic function from its discrete analyticity in a known domain, using the difference operator defined to describe the discrete analyticity is important. In this thesis, the construction of biaalytic function and q-monodiffrict function is explained. Bifuncions and q-monodiffrict constants are well-studied. They stand to replace the concepts of functions and complex numbers respectively of the classical complex function theory. The condition that the usual product of two q-monodiffrict functions in a given domain is also a q-monodiffrict function there is also obtained and analysed.

Among the three approaches to analytic function theory, the second, namely through the Cauchy integral is considered in the third chapter, whereas the third, namely through power series is dealt with in the fourth chapter. Here two types of integrals are defined either of them will not stand as a counterpart to the classical integral. But both of them taken together represent the theory of integration in q-monodiffrict theory and plays the same role of classical integration. Fundamental concepts of integration like Cauchy’s integral formula and theorem are developed in the q-monodiffrict sense. Meromorphic functions along with pole and polar residue is studied. The relation between these integrals is also obtained.

elminic, analgesic and antifertility properties.
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es on the synthesis and characterisation of the
ganess (II), cobalt (II), nickel (II), copper (II),
lanthanum (III), praseodymium (II) neodymium

cystoside (II), yttrium (III) thorium (IV) and

aspects of emelin and coordination of metal
rands have been discussed in detail. Elemental
nal and magnetic data were used to ascertain
s and to establish the structures of the metal
electron spectra and magnetic data were
ncy of the complexes.

plexes of emelin indicated a metal to ligand
l, cobalt (II), nickel (II), copper (II), zinc (II),
plexes. The chromium (III), iron (III) and the
L ratio of 2:3. A ratio of 1:2 was observed
that emelin behaved as a tetradeionate ligand
through its carbonyl and phenolic oxygen.
stic studies indicated a tetraedrally distorted
II) complex and tetrahedral coordination for
plexes. Four-coordinated structures have been
plexes. Thus the manganese (II), cobalt (II),
complexes were octahedral; thorium (IV)
uranyl complex was six-coordinated.

imposition temperatures (from thermoanalytical
ated were shown to have enhanced thermal
ever, the divalent metal complexes of emelin
able than the iron (II), the chromium (III),
plexes.
The second difficulty in the formulation of the theory is solved by introducing discrete powers in the q-monodiffric sense which leads to the third approach namely representation of discrete analytic functions in the form of an infinite series in terms of discrete powers. Unlike the previous theories, results like n discrete powers of z, has exactly n zeros hold in this theory. Some estimates of discrete powers are applied. Using these estimates convergence of infinite series is discussed. Also a comparison last to decide the convergence of infinite series is found.

The last few sections of the fourth chapter deals with polynomials and zeros of them. Mainly three types of polynomials are studied; polynomials defined over complex numbers, biconstant and q-monodiffric constants. Quadratic polynomials of each type are exercised in detail with the roots of unity in the q-monodiffric sense (as 'limit roots' of $p_n$).

Lastly some special polynomials are discussed. A theory to classify the discrete polynomials is obtained and some special polynomials are classified in this line.

Description of a set of discrete polynomials using generating functions is completely discussed in the final chapter.

S.m.2, MERCY K JACOB.—A study of Discrete Pseudo Analytic Functions—1983—Dr. Wazir Hasan Abdi and Dr. T. Thiruvikraman

This is a study of discrete pseudanalytic functions defined on the lattice, $(a^n, c^n)_{n \in \mathbb{Z}}$ where $a, c$ are fixed, point in C and $q$ a fixed number. In (0,1), this space is studied completely and a brief passage is provided to the diffusion in (1,0).

The theory of discrete functions has its start from P.L. Issac’s work (1941). Issac and people like Ferrand, Duffin and Abdullaev developed the theory mainly on the Gaussian lattice. q-difference theory was developed by Jackson, Habib and Abdi and using this theory C. Herman (1972) developed a discrete analytic function theory on the lattice $H_q = \{(a^n, c^n)_{n \in \mathbb{Z}} \text{ such that } a, c \text{ are fixed, point in C and } q \text{ a fixed number} \}$.

The theory of pseudanalytic functions is a generalization of the theory of analytic functions. When the generator becomes the identity i.e., $e_1$, the theory of pseudanalytic function reduces to the theory of analytic functions. This theory develops a discrete analogue of this theory. In the first chapter of the thesis, an outline of the theory of pseudanalytic functions in the classical continuous case and also a survey of the discrete function theory are given.

S.m.3. SYED AFTAB HUSAIN RIZI.

This thesis is an attempt to throw light on the who wrote in Arabic or Persian, in the history of Mathematics during the eighteenth century. During that period, there were many eminent scholars, who had a profound influence on the development of mathematics. The first chapter is devoted to the life of several mathematicians who wrote in Arabic or Persian, and their works are translated into the modern language.

Chapter II, Importance of Geometry and its History in Mathematics is discussed and illustrated with examples.

Chapter III, Theories of Algebra is devoted to the study of various algebraic systems and their properties, with special emphasis on the development of the theory of matrices and determinants.

Chapter IV, Analysis of Functions is based on the theory of functions of a complex variable, with a focus on the theory of analytic functions and their properties.

Chapter V, Geometry of Curves and Surfaces is concerned with the study of curves and surfaces in three-dimensional space, with a focus on the theory of surfaces and their properties.

Chapter VI, The Theory of Differential Equations is devoted to the study of differential equations, with a focus on the theory of ordinary differential equations and their applications.

Chapter VII, The Theory of Partial Differential Equations is based on the theory of partial differential equations, with a focus on the theory of elliptic, parabolic, and hyperbolic equations.

Chapter VIII, The Theory of Integral Equations is devoted to the study of integral equations, with a focus on the theory of Fredholm and Volterra equations.

Chapter IX, The Theory of Functions of a Complex Variable is based on the theory of functions of a complex variable, with a focus on the theory of analytic functions and their properties.

Chapter X, The Theory of Functions of Several Complex Variables is devoted to the study of functions of several complex variables, with a focus on the theory of holomorphic functions and their properties.