



P R E F A C E

This thesis entitled "GENERALIZATIONS OF CERTAIN ORDINARY AND BASIC POLYNOMIALS SYSTEMS AND THEIR PROPERTIES" incorporates the investigations carried out by me under the guidance of Dr. B.I. Dave, Reader in the Department of Mathematics, Faculty of Science, The M. S. University of Baroda, Vadodara.

In this thesis, two general classes of polynomials and their q -analogues are constructed and their various ordinary and basic properties such as integral representations, differential equations, inverse series relations, series transformations, summation formulas etc. are derived.

The whole work is divided into seven chapters. Chapter-1 gives a brief introduction of history and development of the generalized hypergeometric function and associated polynomials; followed by inverse series relations of these polynomials together with a short account of existing literature on inverse series relations. Also, the basic hypergeometric functions and polynomials related to it are discussed. Lastly, the basic inverse series relations of certain q -polynomials and other general basic inverse relations are stated.

In Chapter-2 a general class of polynomials is defined and the properties like integral representations, differential equation (θ -form), inverse series relations, series transformations are studied for it. A part of it was presented at the 1st annual conference of the "Society for Special functions and their applications", held at Jodhpur in February 2000. Another part of this chapter was presented at State level Research seminar organized by S.P. University, Vallabh Vidyanagar in February 1999. A few known combinatorial identities are obtained as special cases from the general result.

A q -analogue of this general polynomial is constructed in Chapter-3. The various properties studied in Chapter-2 are extended in Chapter-3. A part of it was presented in the form of a paper at the "National conference on mathematical analysis and differential equations", held at the J. N. Vyas University, Jodhpur in November 1997. A piece of work of this chapter has been accepted for publication in the Journal of Indian Mathematical Society. Certain known q -polynomials are inverted through a general result.

Chapter-4 contains unification of some known polynomials. The integral representations, differential equation, inverse series relations etc. are derived for this unified polynomial form. A part of this chapter was presented at the annual conference of the Indian Mathematical Society held in December 2000 at Ahmadnagar.

In Chapter-5, the q -analogues of the results of Chapter-4 are studied. A part of this chapter was presented at the "International conference on Special Functions" held at the Institute of Mathematical Sciences, Chennai, in September, 2002.

Chapter-6 comprises of certain q -series transformation formulas which are derived using the q -integrals obtained in Chapters 3 and 5.

Some basic differentiation formulas and some q -summation formulas are worked out in Chapter-7.

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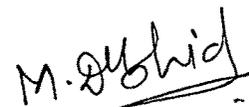
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