ORIGINAL PAPER

q-Difference Recurrence Relations of Aleph Function with Generalization to nth Derivative

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Abstract

Sharma and Jain studied the basic analogue of Meijer's G-function by using the methods of q-calculus and constructed the q-difference operators and their lie algebra. In this article, we employ the same technique for basic anlogue of the Aleph function defined by Dutta et al. and thus on account of general nature of q-analogue of Aleph function, the q-difference recurrence relations of the Aleph function are obtained and an enumerous number of new and known results are special cases of our main results. Also the recurrence relation of I-function and Fox-H function are deduced as special cases by suitable substitutions. Furthermore the generalisation to nth partial derivatives and the required relations are also discussed which are quite general in nature and capable of producing a number of new and known results.

Keywords q-Analogue · q-Calculus · Aleph function · Recurrence relations · q-Gamma function

Mathematics Subject Classification 42C40 · 20C20 · 133D05

Introduction

Liebniz and de L'Hospital together owe the concept of fractional calculus and the credit of well-known fractional Liebniz q-Formula goes to Al Salam [1]. Fractional q-calculus is the extension of the ordinary fractional calculus.The concepts in the calculus without limits popularly known as q-calculus has gained much importance due to the applicability of the results in fields like Lie theory, cosmology, quantum chemistry, theory of heat conduction,

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