

CERTAIN NEW IDENTITIES OF BASIC BILATERAL HYPERGEOMETRIC SERIES

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(**Received:** Jan. 15, 2024 **Accepted:** Apr. 25, 2024 **Published:** Apr. 30, 2024)

Abstract: In the present work, we have applied Cauchy's method to establish some basic bilateral hypergeometric series identities, using the known identities of terminating unilateral series. We also have discussed some important special cases of our results.

Keywords and Phrases: Basic Hypergeometric Series, Basic Bilateral Hypergeometric Series, q -Series, Summations, Transformations, Cauchy's method.

2020 Mathematics Subject Classification: 33D15.

1. Introduction

The basic hypergeometric functions have been an important object of study in the theory of special functions because of their wide range of applications spanning across various fields such as mathematical physics, number theory, orthogonal polynomials and combinatorics. Among these, basic bilateral hypergeometric functions, which generalize the classical hypergeometric functions by allowing both series to extend indefinitely in both directions, are particularly significant. The transformations and summation formulae of these functions are important from the point of view that they reveal deep structural insights and connections between different mathematical entities [9].

The theory of transformations and summations of basic bilateral hypergeometric functions has been enriched by the works of Bailey [3], Slater [16], Shukla [15],