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# A $(p, q)$ -extension of Srivastava's triple hypergeometric function $H_B$ and its properties

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## Abstract

In this paper, we obtain a  $(p, q)$ -extension of Srivastava's triple hypergeometric function  $H_B(\cdot)$ , by using the extended Beta function  $B_{p,q}(x, y)$  introduced by Choi *et al.* [Honam Math. J., **36** (2011) 357–385]. We give some of the main properties of this extended function, which include several integral representations involving Exton's hypergeometric function, the Mellin transform, a differential formula, recursion formulas and a bounded inequality. In addition, a new integral representation of the extended Srivastava triple hypergeometric function involving Laguerre polynomials is obtained.

**MSC:** 33C60; 33C70; 33C65; 33B15; 33C05; 33C45

**Keywords:** Gauss hypergeometric function; Srivastava's triple hypergeometric functions; Appell's hypergeometric functions; Exton's triple hypergeometric functions; Beta and Gamma functions; Eulerian integrals; Laguerre polynomials

## 1. Introduction and Preliminaries

In the present paper, we employ the following notations:

$$\mathbf{N} := \{1, 2, \dots\}, \quad \mathbf{N}_0 := \mathbf{N} \cup \{0\}, \quad \mathbf{Z}_0^- := \mathbf{Z}^- \cup \{0\},$$

where the symbols  $\mathbf{N}$  and  $\mathbf{Z}$  denote the set of integer and natural numbers; as usual, the symbols  $\mathbf{R}$  and  $\mathbf{C}$  denote the set of real and complex numbers, respectively.

In the available literature, the hypergeometric series and its generalizations appear in various branches of mathematics associated with applications. A large number of triple hypergeometric functions have been introduced and investigated. The work of Srivastava and Karlsson [23, Chapter 3] provides a table of 205 distinct triple hypergeometric functions.

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