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GENERAL CLASS OF GENERATING FUNCTIONS AND ITS APPLICATIONS-I

Kamlesh Bhandari

Department of Mathematics,
JIET Group of Institutions, Mogra-Village,
NH-65, Pali Road, Jodhpur- Rajasthan, INDIA
E-mail:bhandarikamlesh604@gmail.com

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Abstract: In this paper, we introduce a general class of generating functions involving the product of modified Jacobi polynomials $P_n^{(\alpha,\beta-n)}(x)$ and the confluent hypergeometric functions ${}_1F_1[.]$ and then obtain its some more general class of generating functions by group-theoretic approach and discuss their applications. Earlier Chandel, Kumar and Senger [1] introduce a general class of generating functions involving the product of modified Bessel polynomials $Y_n^{(\alpha+n)}$ and the confluent hypergeometric functions ${}_1F_1[.]$.

Keywords and Phrases: Generating functions, Modified Jacobi polynomials, Confluent hypergeometric functions.

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1. Introduction

The modified Jacobi polynomials $P_n^{(\alpha,\ \beta)}(x)$ is introduced by Srivastava and Manocha [6] is defined as:

$$P_n^{(\alpha,\ \beta)}(x) = \frac{(1+\alpha)_n}{n!}\ {}_2F_1\left[-n, 1+\alpha+\beta+n; 1+\alpha; \frac{1-x}{2}\right] \tag{1.1}$$

The confluent hypergeometric functions ${}_1F_1$ can be replaced by many special functions such as the Bessel polynomials. Srivastava and Manocha [6] defined and studied various bilinear, bilateral and multilinear generating functions.
In the present paper, we introduce the following new general class of generating functions:

$$G(x,u,w) = \sum_{n=0}^{\infty} a_n P_n^{(\alpha,\ \beta-n)}(x)\ {}_1F_1[-n; m+1; u]w^n \tag{1.2}$$