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Applications of the Finite Operator ${}_3\mathcal{E}_2\left(\begin{matrix}q^{-N},a,b\\c,d\end{matrix};q,-f\theta\right)$ for the Polynomials $B_n(a,b,c,d,f,x,y|q)$

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Abstract

In this work, polynomials $B_n(a,b,c,d,f,x,y|q)$ and the finite q-exponential operator ${}_3\mathcal{E}_2$ are constructed. The operator ${}_3\mathcal{E}_2$ is used to combine an operator proof of the generating function with its extension, Mehler's formula with its extension and Roger's formula for the polynomials $B_n(a,b,c,d,f,x,y|q)$. The generating function with its extension, Mehler's formula with its extension and Rogers formula for Al-Salam-Carlitz polynomials $U_n(x,y,a;q)$ are deduced by giving special values to polynomials $B_n(a,b,c,d,f,x,y|q)$.

Keywords: Finite q-exponential operator, Generating function, Mehler's formula, Rogers formula, Al-Salam-Carlitz polynomials.

تطبيقات المؤثر المنتهي ${}_3\mathcal{E}_2\left(\begin{matrix}q^{-N},a,b\\c,d\end{matrix};q,-f\theta\right)$ لمتعددات الحدود $B_n(a,b,c,d,f,x,y|q)$

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الخلاصة

نقوم ببناء متعددات الحدود $B_n(a,b,c,d,f,x,y|q)$ بالإضافة إلى المؤثرالأسي-q المنتهي ${}_3\mathcal{E}_2$. استخدمنا المؤثر ${}_3\mathcal{E}_2$ لأعطاء برهان المؤثر للدالة المولدة وتوسيعها، صيغة ملر وتوسيعها وصيغة روجرز لمتعددات الحدود $B_n(a,b,c,d,f,x,y|q)$. استنتجنا الدالة المولدة وتوسيعها، صيغة ملر وتوسيعها، وصيغة روجرز لمتعددات حدود السلام – كارلتز $U_n(x,y,a;q)$ بإعطاء قيم خاصة لمتعددات الحدود $B_n(a,b,c,d,f,x,y|q)$.

1. Introduction

In this paper, we use the conventional notations for basic hypergeometric series from [1], and we also suppose that $|q|<1$.

Let a be a complex variable. The q-shifted factorial is described by the authors in [1] as follows:

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