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THE CHARACTERISTIC RELATIONS DUE TO LUPAS- KUMAR-PATHAN- TYPE OPERATORS

Hemant Kumar

Department of Mathematics
D.A-V. (P.G.) College Kanpur 208001 (U. P.), India
E-mail: palhemant2007@rediffmail.com

Dedicated to Prof. A.M. Mathai on his 80^{th} ***birth anniversary***

Abstract: In this work, we introduce Lupas-Kumar-Pathan -type operators and then study its convergence properties by using Cauchy-Schwarz inequalities of integration and summation and Chebyshev inequality of integration. We obtain the recurrence relations and some properties of these operators. These results are then applied with a view to obtaining some characteristic relations on central moments.

Keywords: Lupas operators, Kumar and Pathan type operators, characteristic results on central moments.

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1. Introduction

Lupas proposed a family of linear positive operators mapping $C[0,\infty)$ into $C[0,\infty)$, the class of all bounded and continuous functions on $C[0,\infty)$, namely (see Derriennic [1])

$$V_n(f,x)=\sum_{k=0}^{\infty}P_{n.k}(x)f\left(\frac{k}{n}\right),\ \forall x\in C[0,\infty),\ P_{n.k}(x)=\left(\begin{array}{c} n+k-1 \\ k \end{array}\right)\frac{x^k}{(1+x)^{n+k}}. \tag{1}$$

Later on Sahai and Prasad [5] proposed a modification of Lupas type operators defined for functions integrable on $C[0,\infty)$ in the form

$$B_n(f,x)=(n-1)\sum_{k=0}^{\infty}P_{n.k}(x)\int_0^{\infty}P_{n.k}(t)f(t)dt, \tag{2}$$