

# Unified extension of variance bounds for integrated Pearson family

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**Abstract** We use some properties of orthogonal polynomials to provide a class of upper/lower variance bounds for a function  $g(X)$  of an absolutely continuous random variable  $X$ , in terms of the derivatives of  $g$  up to some order. The new bounds are better than the existing ones.

**Keywords** Completeness · Derivatives of higher order · Fourier coefficients · Orthogonal polynomials · Parseval identity · Pearson family of distributions · Rodrigues-type formula · Variance bound