The exceptional Bessel polynomials

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Abstract

Gómez-Ullate, Kamran and Milson have found polynomial eigenfunctions of a Sturm-Liouville problem [1]. These polynomials, denoted by $X_1$—Laguerre and $X_1$—Jacobi and starting with degree one, are eigenfunctions of a second order linear differential operator. In this paper, we investigate the $X_1$—Bessel case which we denote by $B^\alpha_n(x)$. We wrote these polynomials as explicit functions of $n$, decompose it for the basis $(x-b)^2 x^i$, and we expand $B^\alpha_n(x)$ in terms of Bessel orthogonal polynomials $B^\alpha_n(x)$, using generalized Carlitz formula.

Finally, we give a non-hermitian orthogonality satisfied by these polynomials.

References