

The Quantum Krawtchouk and q -Meixner Polynomials and the related D -Functions for the Quantum Groups $SU_q(2)$ and $SU_q(1, 1)$

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Abstract

The complete comparative analysis of the Quantum Krawtchouk and q -Meixner polynomials of a discrete variable on a nonuniform grid $x(s) = q^{2s}$ and the D -function for the quantum groups $SU_q(2)$ and $SU_q(1, 1)$ is done. The complete set of characteristics of these polynomials (i.e. orthogonality relations, normalization factors, recurrent relations, the explicit analytical expressions, the Rodrigues formulas, the formulas of difference derivatives, various particular values and cases) are calculated. The correlations between the properties of the polynomials mentioned above and the D - functions for the quantum groups $SU_q(2)$ and $SU_q(1, 1)$ are established. In the case of $SU_q(1, 1)$ only D -functions for the positive discrete series of the unitary irreducible representations are considered.