

1072-33-12

Daniel Joseph Galiffa* (djg34@psu.edu). *On the Classical and Quantum Orthogonal Polynomial Solutions to a Class of Differential-Difference Equations.*

We first briefly address how orthogonal polynomial solutions have previously been extracted from the differential-difference equation $\pi(x)DP_n(x) = (\alpha_n x + \beta_n)P_n(x) + \gamma_n P_{n-1}(x)$, where $\pi(x)$ is a polynomial of degree at most 2, with respect to both the differential operator $D = d/dx$ and the quantized difference operator $D = D_q$. From there, we discuss how orthogonal polynomial solutions were recently obtained from this equation with respect to the operator $D = D_{q^{-1}}$. Among these solutions were the well-known and fully classified Al-Salam Carlitz II, discrete q -Hermite II, q -Laguerre and Stieltjes-Wigert polynomials. In addition, we also elaborate on the orthogonal polynomial solutions which were obtained that, to the best of our knowledge, have not been fully characterized and require further analysis. We conclude with a discussion regarding the future research that stems from this work and a generalization to the equation above. This research was completed in conjunction with Sarah J. Johnston; University of the Witwatersrand, S. Africa. (Received May 05, 2011)