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16563. *Characterizing the General Sheffer Orthogonal Polynomial Sequences*. Preliminary report.

The presenter recently published the research monograph “On the Higher-Order Sheffer Orthogonal Polynomial Sequences” in the Springer Briefs in Mathematics series. The first part of this work rigorously describes the analysis that I.M. Sheffer utilized in characterizing all of the A-Type 0 orthogonal polynomials, i.e. the Sheffer Sequences, J. Meixner’s approach to the same characterization problem as Sheffer, extensions to such characterizations by E.D. Rainville and W.A. Al-Salam and related results as well.

The second part of this work discusses several of the applications of the Sheffer Sequences, including differential equations, difference equations, quantum mechanics and numerical integration. Finally, the novel work of the monograph describes and implements a method for analyzing the Sheffer A-Type 1 class and discusses how this method can be used to analyze other higher-order Sheffer classes and similar characterization problems as well. In this talk, we show how the aforementioned monograph lends itself to determining all of the general Sheffer A-Type k orthogonal sets and connects this problem to a work completed by W.A. Al-Salam that may not be well-known to non-experts. (Received September 24, 2012)